

Model-Based Software Process Improvement

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This presentation demonstrates our organization's approach to model-based Software Process Improvement (SPI). Our organization, a Process Transfer Technology Affiliate of the STARS program, was selected in April 1993 to participate as a field test site for the Software Engineering Institute (SEI) Software Process Definition (SPD) project. The products tested included the improvement model itself, descriptive modeling techniques, the CMM level 2 framework document, and the use of process definition guidelines and templates.

The SPI model developed by the SPD project at the SEI represents a five stage cyclic approach for organizational process improvement. The cycle consists of the initiating, diagnosing, establishing, acting, and leveraging phases. Our organization's three year Total Quality Initiative facilitated the adoption of this model for our software improvement teams.

The process improvement infrastructure includes the steering committee, SEPG team leader, the SEPG core advisors, Quality Management Boards (QMB), and designated working groups chartered by the SEPG. The QMB's directly support the strategic goals of the organization. Monthly briefings from the SEPG team leader to the steering committee and the QMB's facilitate the integration of the SPI initiative with the strategic business goals.

The SPD project at SEI field-tested the Process Framework Document for CMM level 2 at our organization. The document provides checklists to determine CMM compliance for each Key Process Area (KPA). In addition, we gained insight into the necessary organizational components to support well-defined processes.

Process Definition (PD) training was provided for our SEPG, Technology QMB, and the Project Planning Working Group. Our SEPG recognized the need to establish a documented standard approach for PD that all software improvement teams can use (i.e. a well-defined process!). Our Process Breakdown Structure establishes planning, definition, and enactment as the top-level phases of the Process Engineering life-cycle.

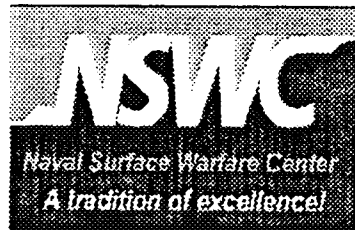
The process planning phase is necessary to baseline and document the current process by establishing the purpose and the high-level process flow. In addition, it is important to set the policy that will over-arch the process and help set the context for the follow-on process definition engineering. The process definition phase is decomposed into three activities: layout, design, and enactment information. The layout activity establishes the process relationships by organizing the high-level entry/tasks/validation/exit (ETVX) information and defining the work flow and work products associated with the process. In addition, a mid-level process flow is established during this step which will facilitate using the information organizers in the design activity. The agents that will perform each task are also identified during this activity.

The design activity of the definition phase is characterized by the use of multiple information organizers (i.e. templates) which provide the necessary data to develop the enactment information. Measurement criteria and the validation method are further defined in this stage of process definition.

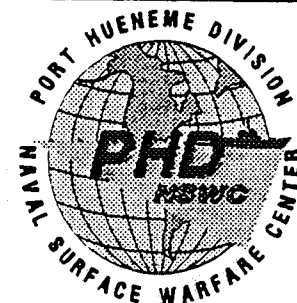
The development of the enactment information is the last activity to be performed in the definition phase of process engineering. The procedures must be developed during this activity in order to trial test the process during a pilot project. The training requirements for the process must also be established at this time.

The enactment and process support is the final phase of process engineering and constitutes the institutionalization of the process. This phase must establish process control and process assurance procedures to ensure that the process has the ability to improve. A training plan is important to support the on-going use of the process.

The outer ring represents all of the work products developed during the process engineering life-cycle. In an attempt to avoid shelfware, the SEPG is targeting a Process User's Manual for each KPA that will contain only the essential information required for the user of the process.



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MODEL - BASED SOFTWARE PROCESS IMPROVEMENT

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AGENDA



SPI MODEL

IMPROVEMENT INFRASTRUCTURE

ESSENCE OF LEVEL 2

PROCESS DEFINITION FRAMEWORK

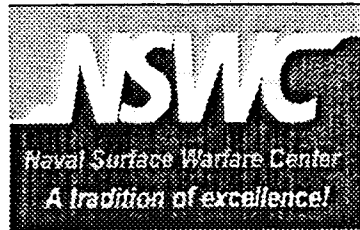
– PLANNING

– LAYOUT

– DESIGN

– ENACTMENT

PROCESS MANUAL



SOFTWARE PROCESS IMPROVEMENT MODEL



Initiating

Stimulus for
Improvement

Set Context
and Establish
Sponsorship

Establish
Improvement
Infrastructure

Appraise and
Characterize
Current
Processes

Diagnosing

Develop
Recommendations
& Document Phase
Results

Leveraging

Document
and Analyze
Lessons

Revise
Organizational
Approach

Acting

Implementation plan
Define processes
Define measures
Plan and execute pilot(s)
Plan, execute, and track
installation

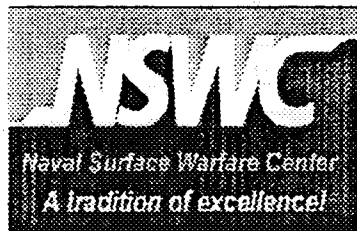
Establish Process
Action Teams

Action
Planning

Set Strategy
and Priorities

Establishing

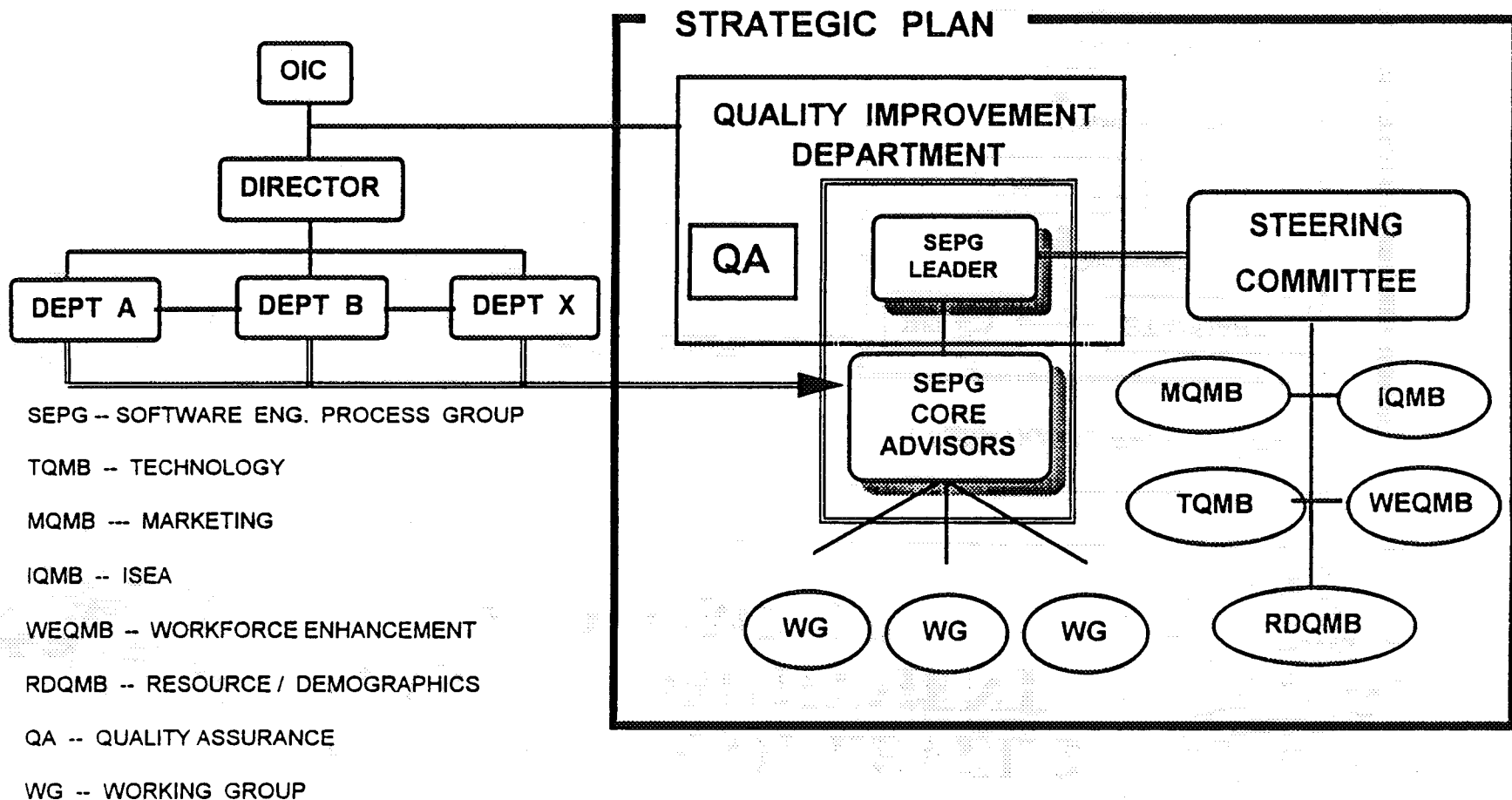
PAT Charters &
Plans

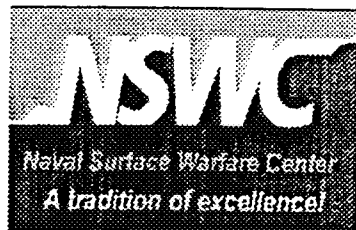


NSWC - PHD - ECO PROCESS IMPROVEMENT INFRASTRUCTURE

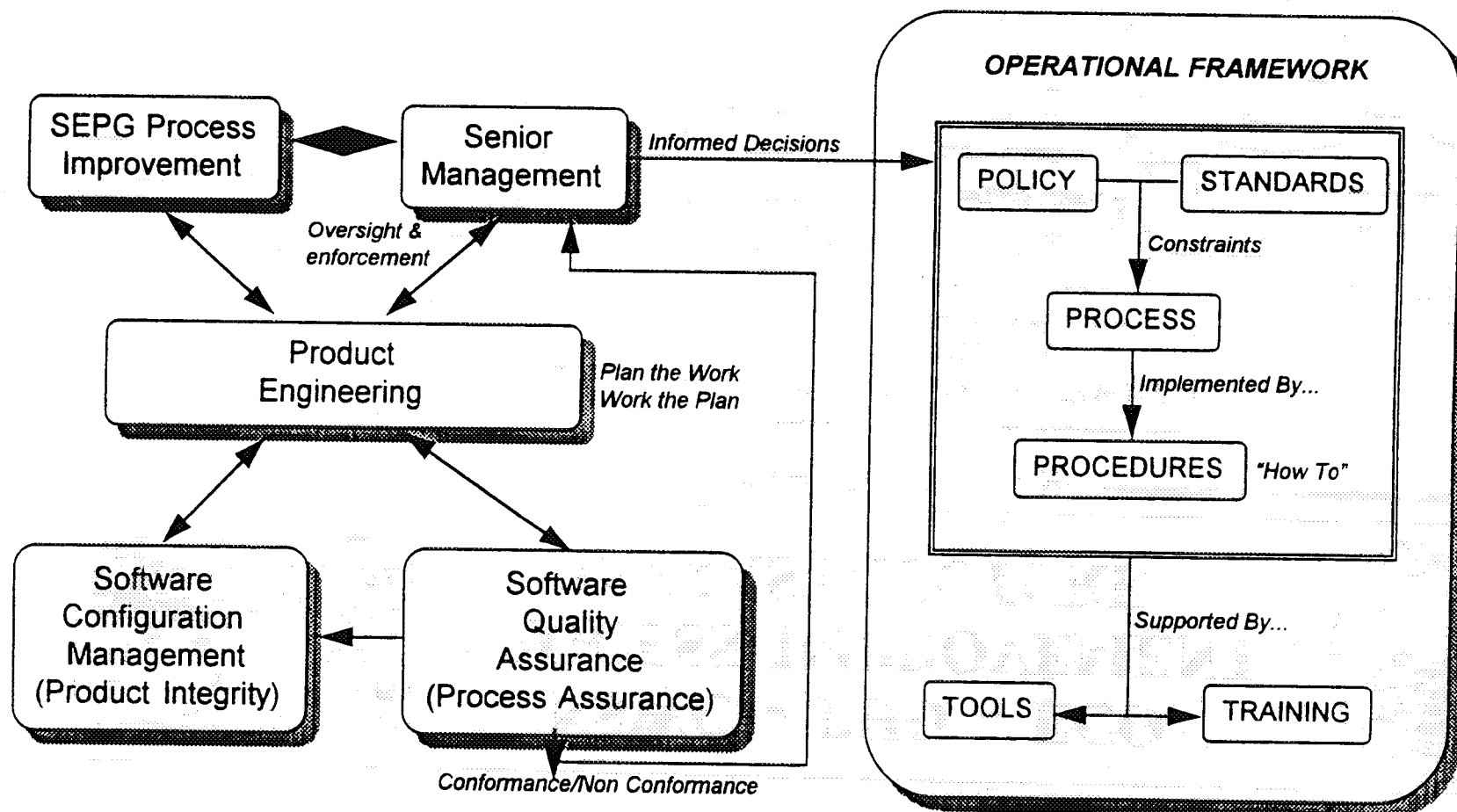


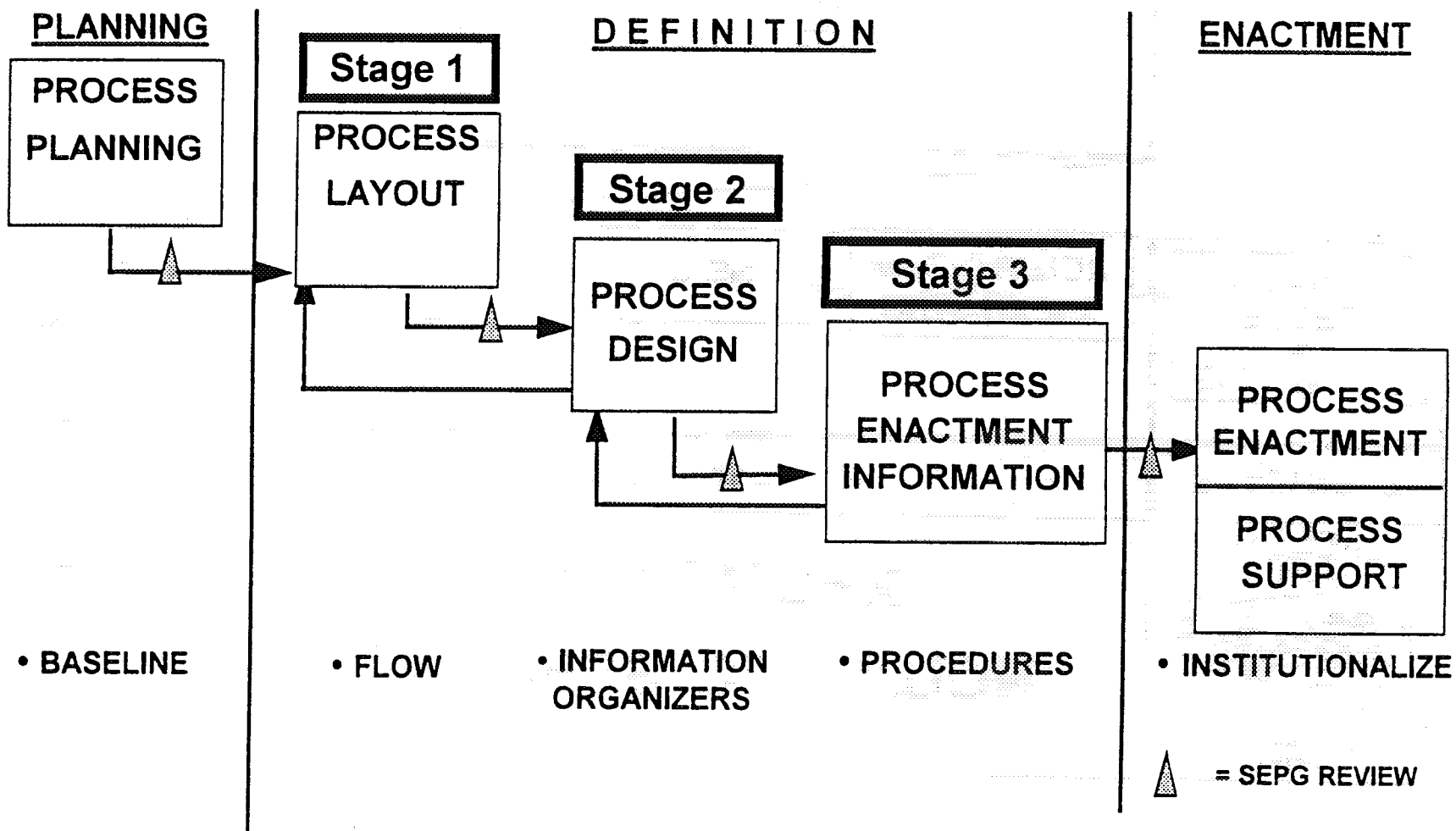
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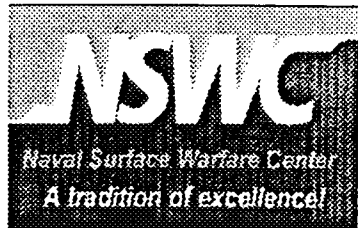




THE ESSENCE OF LEVEL 2 “TAKES COMMITMENT AND TIME !”







PROCESS DEFINITION FRAMEWORK



PLANNING

DEFINITION

ENACTMENT

PROCESS
PLANNING

LAYOUT

DESIGN

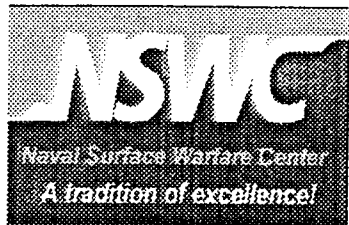
ENACTMENT
INFORMATION

ENACTMENT
&
PROCESS
SUPPORT

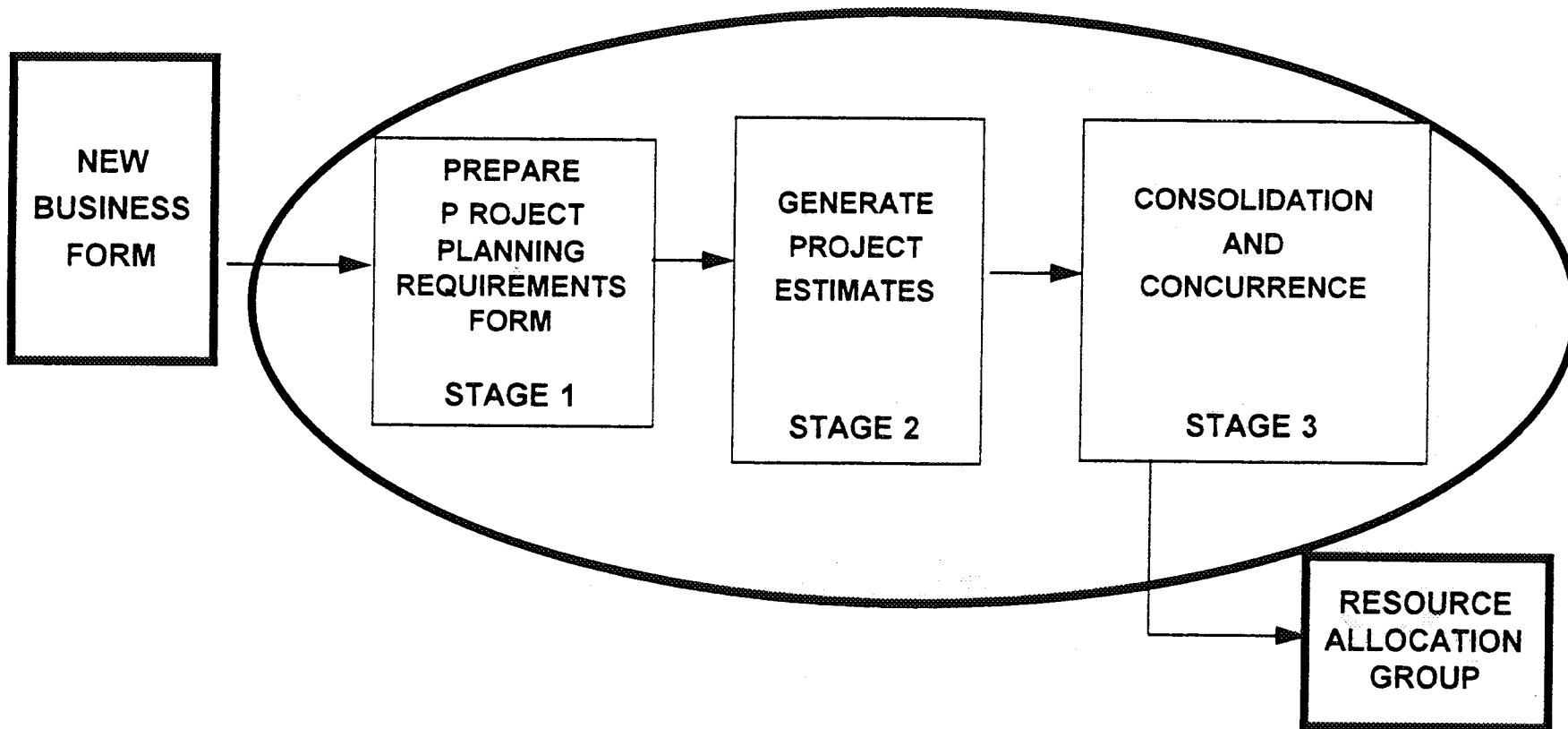
- BASELINE
 - DATA GATHERING
 - AUDIENCE
 - ROLES
 - USAGE
 - KNOWLEDGE
 - MOTIVATION
 - INTERVIEW

• HIGH LEVEL PROCESS FLOW

• POLICY STATEMENT



PROJECT PLANNING COMMITMENT PROCESS





PROCESS DEFINITION FRAMEWORK



PLANNING

DEFINITION

ENACTMENT

PROCESS
PLANNING

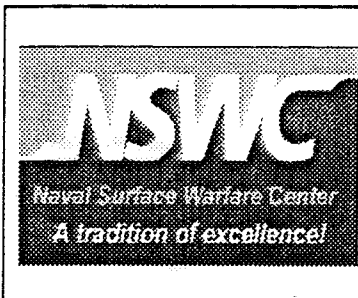
LAYOUT

DESIGN

ENACTMENT
INFORMATION

ENACTMENT
&
PROCESS
SUPPORT

- PROCESS RELATIONSHIPS
 - INITIAL MODEL
 - ETVX
 - MID - LEVEL PROCESS FLOW
 - WORK PRODUCTS DEFINED



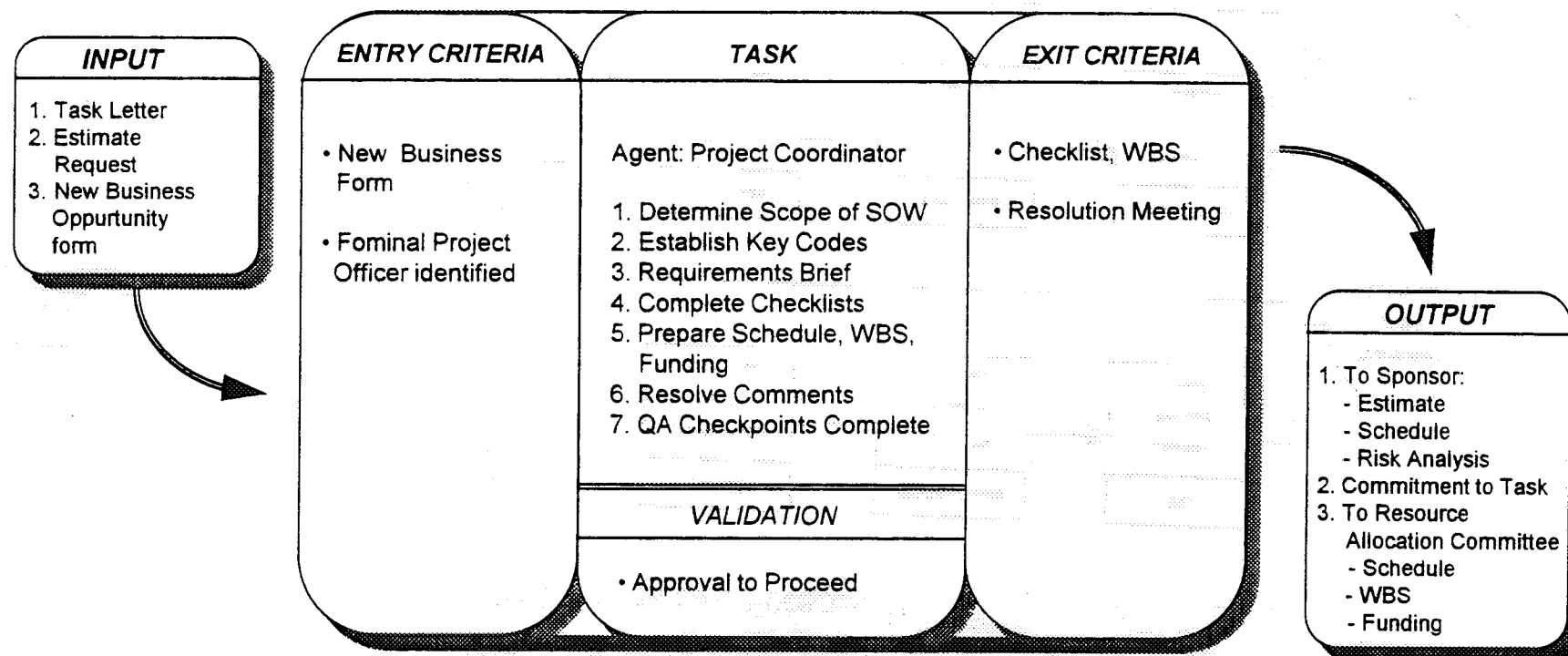
THE ETVX PROCESS

(ENTRY, TASK, VALIDATION, EXIT)



PURPOSE: Ensure all Departments and Divisions are involved in Project planning process

TASK: Project Planning (Bids, RFP, Potential)

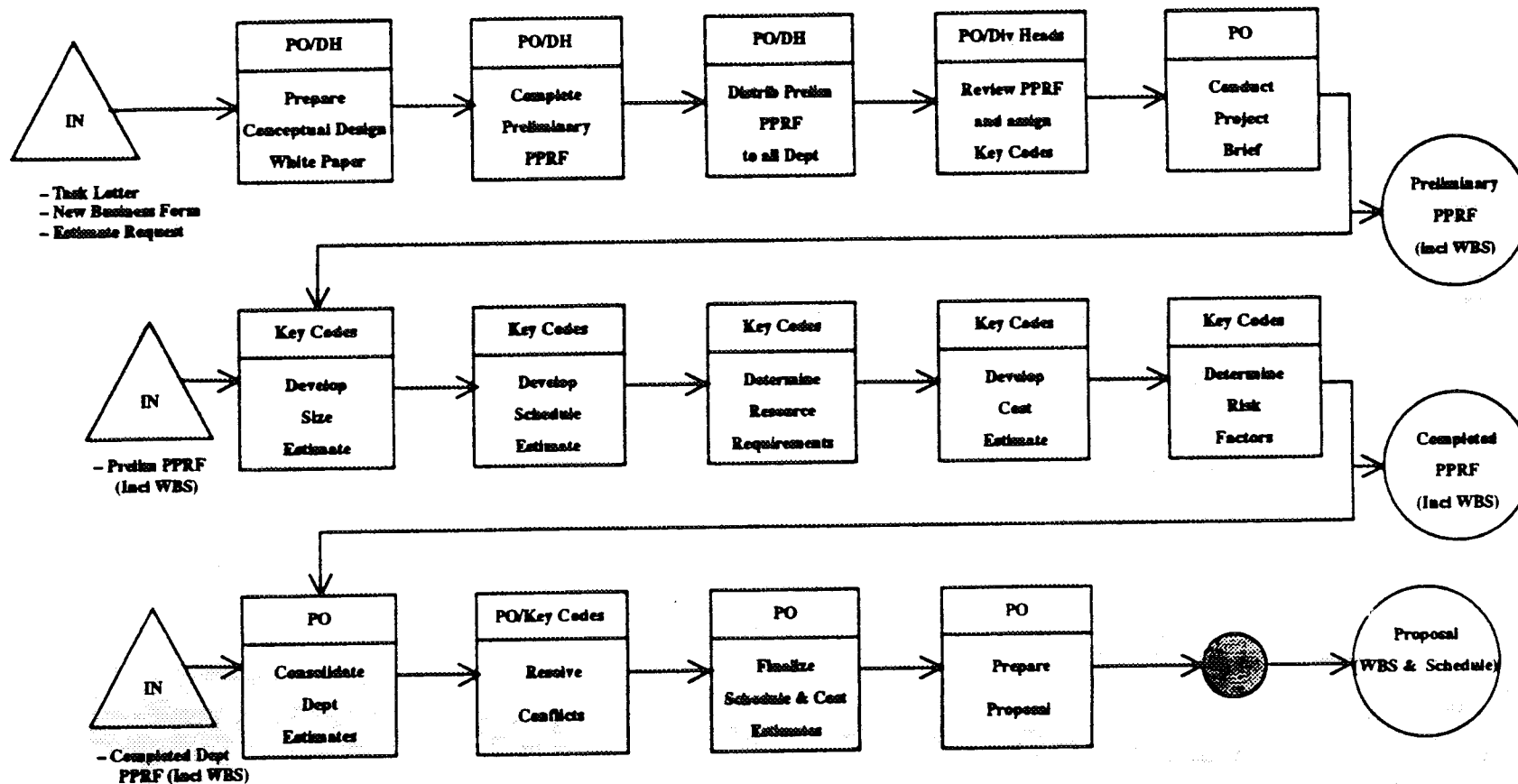


PARENT: Project Officer's Handbook

ACTION CODE: Project Coordinator

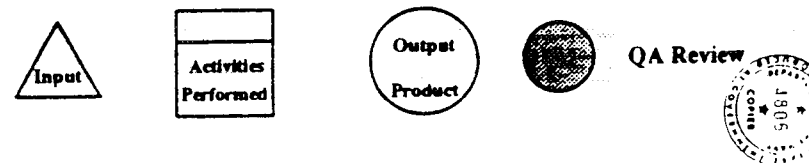
Project Planning Process

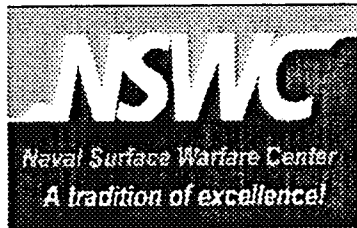
(Bid, Proposal, Potential)



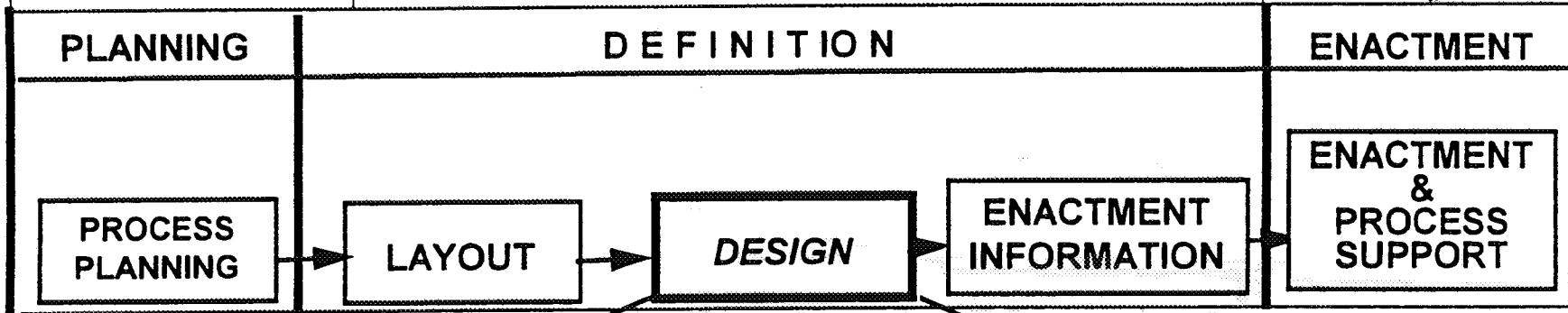
PO = Project Officer
 DH = Department Head
 PPRF = Project Planning Requirements Form

Legend:

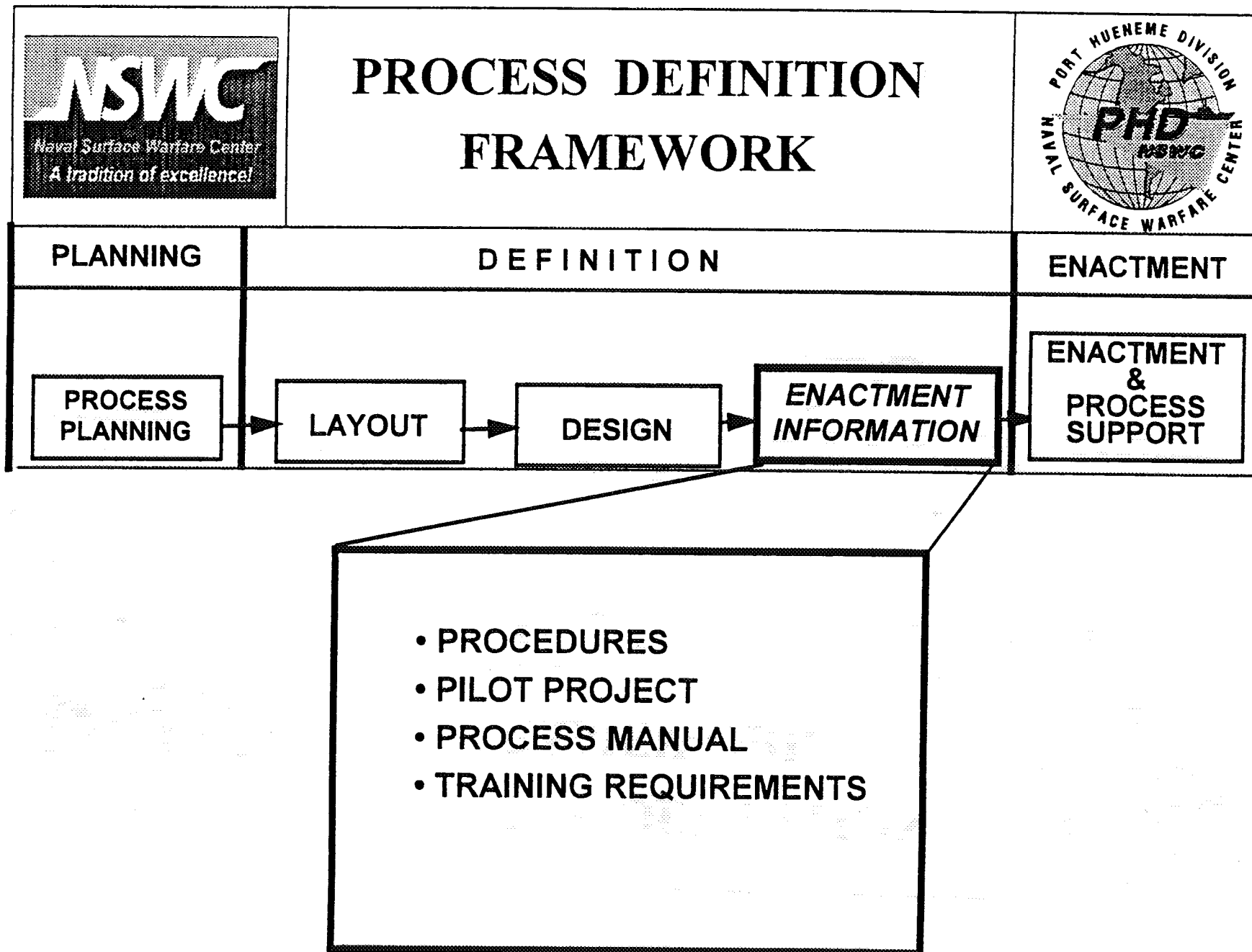


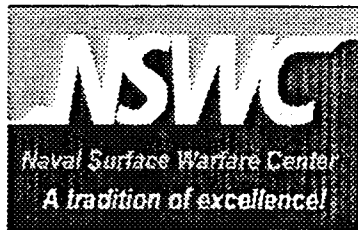


PROCESS DEFINITION FRAMEWORK



- INFORMATION ORGANIZERS
 - INPUTS
 - OUTPUTS
 - TASKS
 - AGENTS
 - MEASUREMENTS
 - VALIDATION





PROCESS DEFINITION FRAMEWORK



PLANNING

DEFINITION

ENACTMENT

**PROCESS
PLANNING**

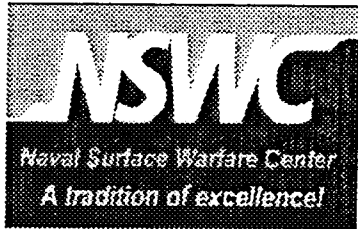
LAYOUT

DESIGN

**ENACTMENT
INFORMATION**

**ENACTMENT
&
PROCESS
SUPPORT**

- INSTITUTIONALIZATION
 - PROCESS CONTROL
 - MONITOR
 - MEASUREMENT
 - ANALYSIS
 - IMPROVEMENT
 - PROCESS ASSURANCE
 - TAILORING / GUIDANCE
 - ENFORCEMENT
 - TRAINING PLAN



KEY PROCESS AREA PROCESS MANUAL

